

# Improving Student Safety

CS591 L1: Data Mechanics

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## Introduction

Boston has multiple K-12 schools, colleges, and universities, many of which are ranked top schools in the nation. Even so, as Boston is a major metropolis, it is also filled with crime, from minor infractions to serious felonies. As we walk to class along Commonwealth Avenue, we can hear multiple sirens racing down the street. Our phones are filled with warning messages from BUPD about crime incidences nearby.

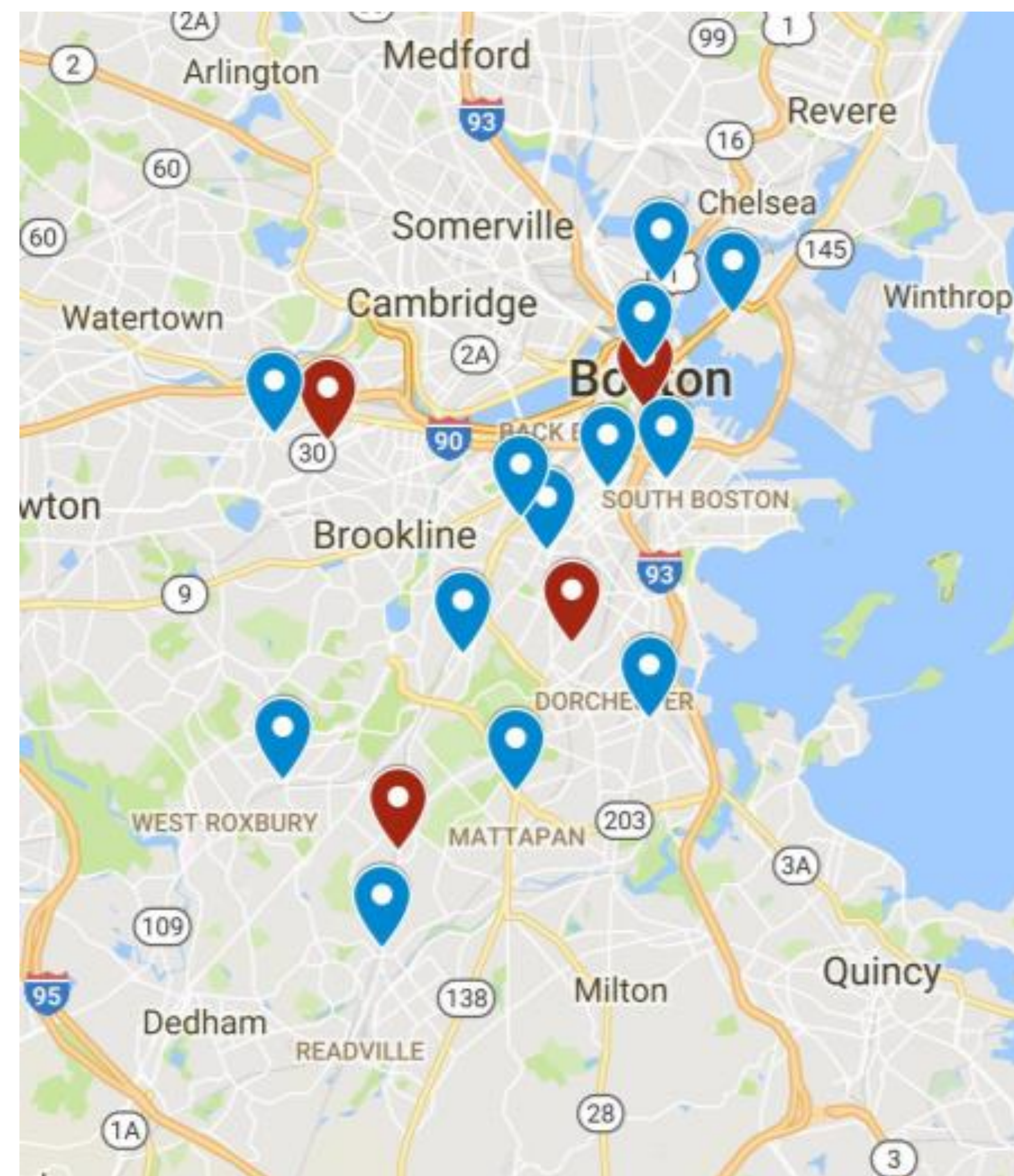
Our goal is to analyze the concentration of these crimes in relation to police stations in the area. We hoped to combine these data sets so we can see if there is any correlation between the prevalence of crime and police stations in Boston. Our hypothesis was that there was a higher concentration of crime near police stations and therefore we should build students help centers, so students who are passing through the area and felt threatened (being followed, harassed, etc) can come to the help centers if they didn't feel comfortable or necessary or unable to call the police.

## Datasets

Datasets are from Analyze Boston and include:

- Crime Incident Report (August 2015 – To Date)
  - Type of incident as well as when and where it occurred
- Boston Police Stations
  - List of locations which include latitude and longitude

Map of Student Help Centers and Police Stations



Blue: Police Stations

Red: Student Help Centers

## Future Work

- Include property values in relation to crime
- Include school (mainly colleges and universities) locations in relation to crime
- Expand to other factors that endanger students, like traffic

## Analysis

### Optimal Locations for Student Help Centers

We believe help centers should be located in areas where crime rates are higher, and should be at least one km away from any police departments (otherwise it would be useless). In addition, no more than four help centers are allowed considering budgets and rental spaces. We used the k-means algorithm to find geographical centers of areas with higher frequency of crime. Then we filtered out centers that do not satisfy our constraints. The remaining centers are help center locations.

### Correlation between Police Stations and Crime

We wanted to find out whether the presence of police reduces crime in nearby areas. We calculated the correlation coefficient between distance to the closest police department and number of crimes in the area. Distances are categorized in ranges of 0.5km (i.e. 5 ~ 5.5km). We found a correlation of around -0.865 which shows that the closer to a police station, the higher crime rate in the area. From this we know that the presence of police stations don't necessarily help reduce crime.

